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Soil Survey

of

Franklin County, North Carolina

By

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and

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Bureau of Chemistry and Soils

In cooperation with the
North Carolina Department of Agriculture
and the North Carolina Agricultural Experiment Station

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COUNTY SURVEYED

Franklin County is situated in the north-central part of North Carolina (fig. 1). It has an area of 492 square miles, or 314,880 acres. Louisburg, the county seat, is about 32 miles northeast of Raleigh, the State capital.

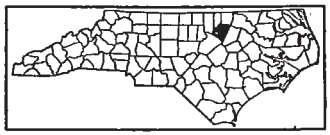

FIGURE 1.—Sketch map showing location of Franklin County, N. C.

Franklin County has the smoothest surface relief of the counties in the piedmont plateau section of the State. The surface relief ranges from almost level, undulating, and gently rolling in the broad interstream areas to strongly rolling bordering the stream courses or first-bottom land. Some of the smoother surfaced areas coincide with Durham sandy loam, the Appling sandy loams, and the Cecil sandy loams, whereas the roughest and most broken areas coincide with Wilkes coarse sandy loam, Cecil clay loam, and Georgeville silty clay loam. The surface relief of the first- and second-bottom areas is level or gently undulating. Some of the steeper slopes, as well as some of the more gentle slopes, are badly eroded, and gullies have formed in many places.

Tar River, running across the county from the northwestern to the southeastern part, forms the main drainage basin. Little Shocco Creek flows along the northern end. These streams, together with Sandy, Red Bud, Cypress, Cedar, Tooles, Middle, Crooked, and Moccasin Creeks and their tributaries, thoroughly drain the county. Numerous streamlets ramify all sections, and every farm is touched by one or more drainageways. Most of the larger streams have cut rather deep and narrow valleys, ranging in depth from 30 to 70 feet and in width from a few feet to one-half mile. A few gristmills are operated by water power on some of the streams, and considerably more water power could be developed on the larger streams.

Elevations above sea level, as shown by the United States Coast and Geodetic Survey, are 375 feet at Louisburg, 432 feet at Franklinton, and 445 feet at Youngsville. The general slope is to the east and south, there being a noticeable difference in elevation between the northern and southern ends of the county.

The forest growth consists chiefly of old-field pine, post oak, white oak, red oak, black oak, red maple, poplar, hickory, and a few birch, with a scattered undergrowth of holly, dogwood, redbud, and sweetgum. Most of the merchantable timber has been cut, but there are

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a few areas of second-growth forest, which will, within a few years, produce merchantable timber.

Franklin County was formed from Granville County in 1779. Most of the early settlers were English, and some were of Scotch ancestry. The population, according to the 1930 census, is 29,456 people, all classed as rural. It is fairly evenly distributed. Settlement is comparatively dense around all the towns and villages. Louisburg, the county seat, had a population of 2,182 in 1930. Other towns are Franklinton, Youngsville, and Bunn, and smaller settlements are Pilot, Riley, Mapleville, Gupton, Centerville, Wood, Alert, Epsom, Justice, and Ingleside.

Two railroads cross the county, the main road of the Seaboard Air Line and a branch of the Atlantic Coast Line, furnishing transportation to outside markets. The county is served by five State highways which afford the main routes of travel. Public roads extend to practically all sections and are generally good throughout the year. Churches and schoolhouses are established in convenient locations. Many school districts have been combined, and the pupils are transported to the consolidated schools in trucks or busses. Louisburg College is located at Louisburg. Telephone service is available in many parts, and rural mail routes reach practically all sections.

Louisburg and Franklinton are the principal local markets for farm produce, and most of the cotton is sold in these towns. There are three tobacco warehouses in Louisburg, but a large part of the tobacco is sold in Rocky Mount, Oxford, and Henderson. Franklinton supports a towel factory and cotton mill.

CLIMATE

The climate is mild and equable. The summers are long and usually hot, and the winters are short and not severe. The extreme range in temperature is 113° F. In the winter the soils are frozen to a comparatively slight depth and for only short periods.

The temperature is sufficiently mild for the growing of winter cover crops and hardy vegetables. Outdoor work can be performed most of the time during the winter, except on rainy days and when snow is on the ground. The average frost-free season is 197 days, which is sufficient time for maturing the crops commonly grown in this section.

The average rainfall is abundant and well distributed during the growing season. The driest period occurs from September to December, thus giving excellent weather for harvesting crops and for sowing wheat, oats, and cover crops. The climate is favorable for the production of bright tobacco, cotton, peanuts, a wide variety of leguminous crops, sweetpotatoes, sorgo, fruits, and garden vegetables.

Table 1, compiled from the records of the Weather Bureau station at Louisburg, gives the more important climatic data.

TABLE 1.—*Normal monthly, seasonal, and annual temperature and precipitation at Louisburg, Franklin County, N. C.*

[Elevation, 375 feet]

Month	Temperature			Precipitation			
	Mean	Absolute maximum	Absolute minimum	Mean	Total amount for the driest year (1933)	Total amount for the wettest year (1929)	Snow, average depth
	°F.	°F.	°F.	*Inches*	*Inches*	*Inches*	*Inches*
December	41.5	74	−4	3.28	1.28	2.13	2.0
January	40.2	79	−10	3.37	4.17	2.05	2.6
February	41.3	79	−6	3.99	3.34	5.44	4.2
Winter	41.0	79	−10	10.64	8.79	9.62	8.8
March	50.7	92	10	3.76	2.44	4.89	1.5
April	60.7	96	21	3.53	5.98	3.15	.5
May	67.6	100	30	3.87	2.19	5.61	.0
Spring	59.7	100	10	11.16	10.61	13.65	2.0
June	75.1	100	46	4.44	1.49	7.45	.0
July	78.1	101	48	5.64	3.09	6.35	.0
August	77.1	103	51	4.77	5.39	5.92	.0
Summer	76.8	103	46	14.85	9.97	19.72	.0
September	71.5	101	37	3.40	1.29	1.73	.0
October	60.2	92	26	2.82	.56	8.02	(1)
November	48.9	82	14	2.30	.97	5.43	.2
Fall	60.2	101	14	8.52	2.82	15.18	.2
Year	59.4	103	−10	45.17	32.19	58.17	11.0

[1] Trace.

AGRICULTURE

The early agriculture in Franklin County consisted mainly in the production of corn and small grains, together with the raising of some cattle, sheep, and hogs. Tobacco and cotton became important crops about 1850, and for a few years following the production of all crops increased. The plantation system of farming prevailed until the Civil War. With the freeing of the slaves a complete readjustment of farm conditions necessarily took place. Crops which required the least labor and which were most readily converted into cash were grown. Cotton became the principal crop, and later tobacco became an important cash crop. Table 2 shows the acreage devoted to the various crops grown in 1879, 1889, 1909, 1919, and 1929.

TABLE 2.—*Acreage of the leading crops in Franklin County, N. C., in stated years*

Crop	1879	1889	1899	1909	1919	1929
	Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*
Corn	32,642	30,237	37,656	32,229	27,812	21,953
Wheat	8,362	5,326	4,300	2,088	1,211	351
Oats	5,560	6,756	1,952	1,028	300	39
Potatoes		45	43	92	43	188
Sweetpotatoes	493	887	867	1,078	625	438
Tobacco	118	2,263	10,461	5,909	14,319	15,770
Cotton	30,274	32,703	20,618	29,267	23,195	33,877
Hay	266	911	1,224	1,930	1,873	2,086
	Trees	*Trees*	*Trees*	*Trees*	*Trees*	*Trees*
Apples		25,731	103,958	45,060	23,251	11,219
Peaches		12,121	35,601	21,184	11,421	7,698
Pears		70	1,573	1,500	1,475	846

Both corn and wheat have decreased in acreage, but cotton has increased. The most noticeable increase has been in the acreage devoted to tobacco. The acreage devoted to hay has increased considerably since 1879. The value of all agricultural products in 1929 was about $5,000,000.

Both home-mixed and commercial fertilizers are used. The expenditure for fertilizer, including lime, in 1929 was $606,990, or an average of $152.70 a farm, with 94.5 percent of the farms reporting its use.

Farm labor is mostly native white and Negro and at present is plentiful. When hired by the day, farm hands receive from 50 to 75 cents with board or $1 without board. The total expenditure for labor in 1929 was $95,460. On a majority of the smaller farms and tenant farms, most of the work is performed by the farmer and his family, and during rush times or for extra work the farmers exchange labor.

In 1879, the average size of farms was 110 acres, and in 1929 it was 54.8 acres. The 1930 census reports all land in farms to be 230,366 acres.

A few of the farms are rented for a stated amount of cash, but most of them are rented on a share basis. The general practice is for the landlord to furnish work animals, feed, implements, seed, and one-half of the fertilizer, and to receive one-half of the crop. When the landlord furnishes all the fertilizer, as well as the work animals, equipment, feed, and seed, he receives two-thirds of the crop. The cost of ginning cotton is usually borne equally by the landlord and tenant. In 1930, 31 percent of the farms were operated by owners, 68.8 percent by tenants, and 0.2 percent by managers.

There are many large well-kept farmhouses in the county, a few of which have modern conveniences. The average farmhouse, however, is of medium size and is not particularly well cared for. Most of the barns are small, but they are of sufficient size to house the work animals and crops. The machinery on the average farm includes a 2-horse turning plow, 1-horse turning plow, riding and walking cultivators, stalk cutter, disk harrow, spike-tooth harrow, tractor, cotton planter, lime and manure spreaders, harvester, corn planter, fertilizer distributor, tobacco transplanter, grain drill, cotton plow, and a hayrake. The work animals are mules and horses, mostly mules.

Land values are comparatively low, with practically little demand for farming land. Prior to the depression beginning in 1929, general farming land with good improvements sold at fair prices.

Table 3 sets forth recommendations for the use of fertilizers for the major crops grown on the leading soil types in this county. These recommendations are made by the agronomy department of the North Carolina Agricultural Experiment Station. It will be practical to use other formulas carrying the same quantities of nitrogen, phosphoric acid, and potash to the acre, in the proportion indicated by the formula given. The quantities given in the table are acre applications.

TABLE 3.—*Recommendations for the use of fertilizers with the leading crops on several soils in Franklin County, N. C.*

Soil type	Fertilizer recommended for—		
	Cotton	Tobacco	Corn and small grains
	Pounds	*Pounds*	*Pounds*
Appling coarse sandy loam.	600 to 800 of a 4–10–4 mixture[1] + 15 of nitrogen.	1,000 of a 3–10–6 mixture[1].	300 to 400 of a 4–10–4 mixture[1] + 15 of nitrogen.
Durham sandy loam	----do----	----do----	Do.
Cecil coarse sandy loam	600 of a 4–10–4 mixture[1].	800 to 1,000 of a 3–10–6 mixture.[1]	300 to 400 of a 4–10–4 mixture.[1]
Cecil fine sandy loam	----do----	----do----	Do.

[1] Percentages, respectively, of nitrogen, phosphoric acid, and potash.

With many soils and crops the use of lime in moderate quantities will be necessary for most profitable results. Recommendations for the use of lime are contained in circulars and bulletins prepared by the North Carolina Agricultural Experiment Station, Raleigh, N. C.

Most legumes, and in some places tobacco, will require an application of lime when grown on soils which have not received an application of some form of lime during the last few years and where the pH value is about 5 or below. When lime is needed for tobacco, the form recommended is dolomitic limestone, if the fertilizers used do not carry sufficient magnesia to meet the needs of the crops. For best results it should be applied broadcast in the fall at the rate of 1 ton to the acre (if no application has been made before). If applied in the drill it should be put on the land 60 days before transplanting tobacco. Before making a second application the soil should be tested for acidity.

Following is a list of the highest yielding varieties of the crops recommended as adapted to Franklin County soils: For cotton—Mexican (strains 128–6 and 87–8), Coker Cleveland 884 (strain 4), Coker Farm Relief (strains 2 and 3), Coker Cleveland 5 (strain 5), Humco Cleveland 20 (strain 3); for tobacco—White-stem Orinoco, Cash, Bonanza, and Jamaica; and for corn—Weekly Improved, Southern Beauty, Jarvis Golden Prolific, Indian Chief, and Latham's Double.

Definite systems of handling the soils in this county have not been established. Systematic crop rotations are seldom followed. Tobacco and cotton are sometimes alternated from year to year, but on

many farms cotton follows cotton or tobacco follows tobacco year after year. Some farmers sow rye on tobacco land in the fall and turn it under in the spring. The following crop rotations are especially suited to the soils here: For cotton farms—first year, corn (for grain) with soybeans (for seed, grazing, and turning under); second year, cotton; and third year, cotton (or tobacco on part of land). In connection with this rotation, corn, oats, and soybeans may be grown on land unsuitable for cotton. For cotton and general-farming farms—first year, corn (for grain) and soybeans (for seed, grazing, and turning under); second year, oats or barley and vetch (for hay) followed by soybeans (for hay) or lespedeza (for grazing and turning under); third year, cotton; and fourth year, cotton followed by vetch or crimson clover in the fall (for turning under). If desired, 1 year of cotton may be omitted, leaving a 3-year rotation.

For well-drained soils of fine texture the following pasture mixture (per acre) is recommended: Kentucky bluegrass, 3 pounds; redtop, 3 pounds; white clover, 2 pounds; orchard grass, 8 pounds; oatgrass, 4 pounds; alsike clover, 2 pounds; and lespedeza, 8 pounds. For soils without good drainage, the following mixture is better: Kentucky bluegrass, 3 pounds; redtop, 3 pounds; white clover, 2 pounds; orchard grass, 8 pounds; Dallis grass, 4 pounds; and lespedeza, 10 pounds.

Most of the soils are badly in need of organic matter, as indicated by their dominantly light color. This can best be supplied by growing and turning under leguminous crops, such as vetch, cowpeas, soybeans, and clovers. If these crops are cut for hay, little organic material is left for turning under, but if the seed is harvested with a harvester and the residue plowed into the land, much improvement in the organic matter and nitrogen supply of the soil and in its producing power should result. In the growing of clean-cultivated crops, such as cotton and tobacco, there is very little opportunity for the incorporation of organic matter, and leaching out of the plant nutrients progresses rapidly.

More legumes should be grown for soil improvement and for seed and hay. All available manure should be carefully conserved and applied to the land. If these two practices are followed, the quantity of nitrogen in the commercial fertilizer could be reduced. Another beneficial effect obtained from such practices would be the improvement of the water-absorptive and water-holding capacity of the soils for the growing crops. Furthermore, surface erosion would be checked to some extent. The production of more feed crops on the farms would keep at home large sums of money which are now going to outside markets.

Deeper plowing, in the winter or early spring, when the land is broken, and a more thorough preparation of the seed bed would prove beneficial. If the land were plowed somewhat deeper, more of the rain water would soak into the soil instead of running off and taking much of the valuable surface soil with it. Many of the steeper slopes need terracing and strip farming.

The following publications will provide helpful information for the cultivation of the soils in Franklin County. This list is furnished by the North Carolina State College at Raleigh. North Carolina Agricultural College Extension Folders 8, Tobacco Plant

Beds, and 28, Building Permanent Pastures in Piedmont North Carolina; and North Carolina Agricultural College Agronomy Information Circulars 38, Fertilizer Recommendations for Important Crops of Agricultural Region No. 5 of North Carolina with a List of Soil Types Arranged in Accordance with Their Extent, and 49, I. Factors in Soybean Production. II. Varieties, Recommendations, and Characteristics.

SOILS AND CROPS

Franklin County lies in the eastern part of the piedmont-plateau section of the State. As has been stated, the surface relief is perhaps the smoothest of any of the piedmont-plateau counties in North Carolina. All the land is well drained, except a few very small areas around the heads of streams and in the first bottoms.

About 25 or 30 percent of the land is under cultivation, and in addition to this, a rather large acreage is in pasture, fruit trees, and in use for garden vegetables. Some of the land originally farmed has been abandoned and is now in broomsedge or supports a young growth of timber. Most of the original timber, which consisted of shortleaf pine, oaks, hickory, and poplar, has been cut. Old-field pines are coming back rapidly, and within a few years there will be another crop of merchantable timber. Both sheet and gully erosion have been active and are still going on in the clean-cultivated fields, in places where the slope is more than 3 percent. Bordering the larger streams and on the steeper slopes considerable erosion has taken place, resulting in the removal of the surface soil and in the formation of V-shaped gullies. In some places areas of once productive soils have been poorly managed and ruined by erosion, and they are now grown up to old-field pine.

Many of the soils, such as Appling coarse sandy loam, Cecil coarse sandy loam, and Cecil sandy loam, occur in large continuous areas, particularly in the central and southern parts of the county. Throughout the northern and western parts, the soils are more variable in character and occur in comparatively small areas. The soils have been derived through the soil-forming processes from the weathered materials dominantly of granites, gneiss, schist, diorite, and slate. The so-called "granite soils" are high in potash, particularly in the subsoil and underlying material. The soils differ in their chemical and physical properties, and these differences are in many places revealed in the agriculture and adaptation of the soils to specific crops.

The present-day agriculture of Franklin County consists of the production of tobacco and cotton as special cash crops and corn, together with a small quantity of hay and grain, as subsistence crops. Tobacco is predominantly grown in the east-central and southern parts. Cotton and corn are distributed throughout this section and are also grown throughout other parts.

Tobacco is the principal cash crop, and on this crop, together with cotton, depends the economic condition of a large number of the farmers. Although the greater part of the crop is grown in the central and southern parts of the county and on soils especially well adapted to its growth, some is grown in all parts and on soil not

especially well adapted to its production. Some cash crop is necessary, and either tobacco or cotton meets this demand better than any other crop. The farmers know the many operations necessary to grow and prepare tobacco for market, and it has a ready sale for cash. Most of the tobacco is bright-yellow leaf, although some is of the mahogany grades. The larger part of it is used for the manufacture of cigarettes and smoking tobacco, but some is made into chewing tobacco. The tobacco is flue cured in especially constructed barns, and great care is exercised during curing, in order to obtain the proper color of leaf.

Cotton, the other important cash crop, has a more general distribution than tobacco, or rather is grown to more or less extent on every well-drained soil in the county. The best yields, however, are obtained on the well-developed sandy soils, where they have been fertilized and manured. Cotton differs from tobacco in that it can be stored for a long time without suffering much deterioration, and credit can more readily be obtained on it. The average farmer, especially the tenant farmer, knows how to grow this crop better than any other cash crop as he has helped in the various steps of its production since childhood.

Corn, as regards acreage, is the most important crop, and it is well distributed over the county. This crop is grown to more or less extent on every soil type. Most of it is used to feed the work animals and to fatten hogs, and some is ground into meal for domestic use.

In addition to these three large and important crops, there are several crops of minor importance. There were about 2,000 acres in hay in 1929, which produced slightly more than 1 ton an acre. Wheat, oats, clover, sweetpotatoes, and potatoes occupied a rather large aggregate acreage. Not enough hay is produced to supply the local demand, and large quantities are purchased. Around every well-established farm home there are a few peach and apple trees and a few grapevines. Garden vegetables are grown for home use and to supply the local demand. A small creamery is located in Louisburg. Poultry is raised for home consumption and to supply the home demand for eggs. Small quantities of eggs and chickens are sold or traded at the local stores.

The agriculture of Franklin County bears a close relationship to the different soil types mapped. The soils may be placed in three groups, based on their characteristics and their agricultural uses as follows: Gray sandy soils, red clay loam soils, and miscellaneous soils.

In the following pages, the soils of Franklin County are described in detail, and their agricultural relationships are discussed; their distribution is shown on the accompanying soil map; and table 4 gives their acreage and proportionate extent.

TABLE 4.—*Acreage and proportionate extent of the soils mapped in Franklin County, N. C.*

Type of soil	Acres	Per-cent	Type of soil	Acres	Per-cent
Appling coarse sandy loam	92,416	29.4	Georgeville silty clay loam	4,480	1.4
Appling sandy loam	31,808	10.1	Davidson clay loam	2,304	.7
Durham sandy loam	21,504	6.8	Wilkes coarse sandy loam	26,304	8.4
Cecil sandy loam	32,832	10.4	Worsham sandy loam	320	.1
Cecil sandy loam, mixed phase	3,584	1.1	Altavista fine sandy loam	1,088	.3
Cecil coarse sandy loam	34,176	10.9	Congaree silt loam	5,824	1.9
Cecil fine sandy loam	29,184	9.3	Meadow (Congaree material)	11,968	3.8
Cecil clay loam	17,088	5.4			
			Total	314,880	

GRAY SANDY SOILS

The first group of soils, locally known as the gray sandy soils, includes Appling coarse sandy loam, Appling sandy loam, Durham sandy loam, Cecil coarse sandy loam, Cecil sandy loam, Cecil sandy loam, mixed phase, and Cecil fine sandy loam. These soils occupy by far the greater part of the county.

In surface relief they range from undulating and gently rolling to rolling, and for the most part they occupy favorable positions for farming operations and for the use of improved and modern farm machinery. They are naturally well drained, except in a few of the flatter areas. Where the soil has been poorly managed, some sheet erosion and gullying have taken place on some of the slopes, particularly on the soil mapped as the mixed phase of Cecil sandy loam. Broad, low terraces of the Mangum type have been used in some places and have proved very beneficial. Scattered here and there are a few quartz gravel, but they do not interfere with cultivation. Such areas are shown on the soil map by gravel symbols.

The Appling and Durham soils have light-gray or almost white surface soils and reddish-yellow or yellowish-red heavy clay subsoils. The Cecil soils in this group have gray or light-brown surface soils and red clay subsoils. The texture of the soils of the group is predominantly coarse or medium sand, with a fairly large amount of fine sandy loam.

The light color of the surface soils indicates a low content of organic matter. These soils have been largely leached of the soluble elements of plant nutrients, and much of the fine material in the surface soil has gradually worked down and been deposited in the heavy subsoil. The surface soils, because of their sandy texture, are naturally very mellow or friable, and are very easily tilled. They warm up quickly in the spring, and cultivation can be carried on soon after rains.

The soils of this group dominate the agriculture of the county. On them are grown practically all the tobacco and cotton, much of the corn, and most of the garden vegetables. Durham sandy loam and some of the Appling sandy loam are the best bright-tobacco lands in the piedmont plateau. All the soils of the group are well suited to truck crops, sweetpotatoes, and peanuts. Both the soil and the climate favor the production of tobacco and cotton. Although these soils are naturally low in plant nutrients, they respond

favorably to applications of commercial fertilizer and manure, and they produce the most profitable crops grown in the county.

Appling coarse sandy loam.—The 4- to 6-inch surface soil of Appling coarse sandy loam in cultivated fields is light-gray or yellowish-gray coarse sandy loam containing a large quantity of small angular quartz gravel and some very coarse sand particles. It grades into grayish-yellow or pale-yellow coarse sandy loam continuing to a depth of 8 or 10 inches. The upper layer of the subsoil, to a depth of 2 or 3 inches, is reddish-yellow heavy sandy clay which grades into yellowish-red stiff but brittle clay continuing to a depth of 18 or 20 inches. This material passes into hard but brittle clay, of a light-red color mingled or streaked with yellow and in the lower part with some white, which continues to a depth ranging from 35 to 50 inches. Below this is the soft, disintegrated, and partly decomposed coarse granite rock material. In many places in the subsoil there is a noticeable quantity of angular or subangular quartz gravel.

In wooded areas, the topmost 2 or 3 inches of the surface soil is gray or grayish brown, owing to the presence of a slight amount of organic matter.

Included with mapped areas of this soil are a few bodies which have a heavy, smooth, or slightly plastic clay subsoil. Other inclusions are small spots of Cecil coarse sandy loam and Durham sandy loam. In a few places the surface soil is deeper than that of the typical areas, and in a few other places the surface soil is shallow, owing to a certain amount of surface wash.

Appling coarse sandy loam occupies the largest acreage of the soils in the county. It occurs in large, rather continuous areas, in the central, eastern, and southeastern parts. Large bodies lie north and west of Dickens; west, south, and east of Louisburg; and around Justice, and a large area is mapped along the Wake County line near Moores Pond.

The surface relief ranges from undulating and gently rolling to strongly sloping in some places. Most of the soil, however, occurs on the broad interstream areas and gentle slopes toward the streams. Good surface drainage prevails throughout, but internal drainage does not appear to be quite so good as in the Cecil soils.

Appling coarse sandy loam is an important agricultural soil in this county, and a large proportion of it is under cultivation. The forest growth consists principally of old-field pine, together with some hardwoods. Most of the original timber has been cut. Some of the once cleared, but now abandoned, areas are growing up in old-field pine.

Of the cultivated land, about 30 or 35 percent is devoted to the production of bright tobacco, 35 percent to cotton, 25 percent to corn, and about 10 percent to hay, sweetpotatoes, and other crops. Yields of tobacco range from 600 to 1,000 pounds an acre, when an acre application ranging from 800 to 1,200 pounds of a 3–8–3, 3–8–5, or 3–8–6 fertilizer is used. Cotton yields from one-fourth to three-fourths bale and receives from 500 to 700 pounds of 3–8–3, 3–12–3, 4–10–4, or 2–8–2 fertilizer, with an additional application of about 100 pounds of nitrate of soda after the first chopping of the crop. Before the advent of the bollweevil, yields of cotton were higher

under the same methods of fertilization. Corn yields from 12 to 25 bushels where from 200 to 300 pounds of 3–8–3 or 4–10–4 fertilizer, together with a top dressing ranging from 100 to 150 pounds of nitrate of soda, has been applied. Oats, cowpeas, and rye are grown as feed for the work animals. Sweetpotatoes and garden vegetables, together with some fruit, such as apples and peaches, give good returns.

This soil, as its color would indicate, is deficient in organic matter which can be supplied by turning under such crops as rye, oats, cowpeas, and clover or by the addition of barnyard manure. The soil is easily tilled, can be cultivated under a wide range of moisture conditions, warms up early in the spring, and can be plowed soon after rains.

Appling sandy loam.—Appling sandy loam differs essentially from Appling coarse sandy loam in that it is finer in texture both in the surface soil and subsoil. The color throughout these two layers is similar to that of the corresponding layers of the coarse sandy loam. The surface relief and drainage conditions are similar to those of the coarse sandy loam and of Durham sandy loam.

Appling sandy loam occurs mainly in the central and southern parts of the county. A few large areas lie west of Franklinton, in the vicinity of New Hope, and in the extreme southern part of the county, and a few occur around Moulton and Corinth Church.

The crops grown, kind of fertilizers applied, methods of cultivation, and crop yields are practically the same as those for Appling coarse sandy loam.

Durham sandy loam.—Durham sandy loam in cultivated fields is light-gray or whitish-gray light-textured sandy loam to a depth of 4 or 6 inches. This is underlain by pale-yellow mellow sandy loam which continues to a depth ranging from 10 to 14 inches. The subsoil, to a depth ranging from 25 to 36 inches, is yellow moderately stiff but brittle clay or heavy sandy clay. This grades into mottled light-red, yellow, and gray stiff but brittle sandy clay material which, at different depths, is underlain by disintegrated granitic material from which the soil is derived.

Durham sandy loam is the lightest colored soil in the county, especially in cultivated fields where the sand has beaten out on the surface. In wooded areas the topmost 1 or 2 inches of soil are darkened by a small amount of organic matter. In a few places the subsoil is rather heavy smooth yellow clay. Locally, the sandy surface soil is thicker, owing to slight translocations of material from higher lying positions. Mapped with Durham sandy loam are small spots of Appling and Cecil sandy loams which are too small to be shown separately. In a few localities the surface soil is light-gray coarse sandy loam. Locally, a few quartz gravel and quartz rock are present on the surface.

Large areas of Durham sandy loam occur in the extreme southern end of the county, south and west of Pine Ridge School, in the vicinity of New Harris School, and around Harris Crossroads. Scattered bodies are developed throughout the eastern and southern parts, and large areas lie southeast of Youngsville.

Durham sandy loam has the smoothest surface relief of the upland soils in this county. It is developed in the broad interstream areas

and for the most part is almost level, undulating, or gently sloping. It is naturally well drained.

A fair proportion of the land is under cultivation. This is considered the best soil, not only in Franklin County but in the piedmont-plateau section of the State, for the production of bright-leaf tobacco. Tobacco, cotton, and corn are the principal crops grown. Some rye, sweetpotatoes, garden vegetables, fruits, and sorgo are successfully grown. Peanuts would do well if the soil were limed and properly fertilized. Yields of cotton and corn are lower on the Durham soil than on the associated soils. Yields of tobacco range from 500 to 1,000 pounds an acre, depending on the quantity of fertilizer applied and the general condition of the soil. Tobacco receives from 500 to 1,000 pounds of a 3–8–3 or 3–8–5 fertilizer, and some farmers apply a top dressing of about 100 pounds of 1–0–4 fertilizer when the plants are from 12 to 15 inches high. A few farmers make a side application ranging from about 50 to 100 pounds of nitrate of soda.

The fertilizer treatment, methods of cultivation, and suggestions for the improvement of this soil are the same as those recommended for Appling coarse sandy loam.

Cecil sandy loam.—The 4- to 6-inch surface layer of Cecil sandy loam in cultivated fields is gray, light-brown, or grayish-brown mellow and friable sandy loam. It is underlain by brownish-yellow sandy loam which, at a depth ranging from 7 to 10 inches, grades into reddish-yellow or yellowish-red friable sandy clay. The subsoil, beginning at a depth between 8 and 15 inches, is red stiff but brittle clay which continues to a depth ranging from 30 to 50 or more inches. The underlying material consists of soft disintegrated and partly decomposed rock material of streaked and specked red, yellow, and white colors. In wooded areas the topmost 1 to 3 inches of soil contain enough organic matter to produce a dark-brown color. In a few places the sandy surface soil is thicker, particularly on some of the lower slopes where material has been washed from the outlying areas. In some places the surface soil is shallow, and in some it has been removed, exposing the red clay loam. A few angular quartz gravel and quartz fragments are present on the surface in some places.

Cecil sandy loam occurs mainly in the western part of the county where large continuous areas are developed in the vicinity of Youngsville and Franklinton, along the Seaboard Air Line Railway, and around Mount Olive Church. Fair-sized bodies occur in the northern part, around Ingleside and Kearney. Smaller areas are scattered over the county, particularly in the southern part west of Pine Ridge School and southwest of Pilot.

This soil occupies high, broad, interstream areas as well as gradual slopes toward the streams. It has smooth, gently sloping surface relief and is everywhere naturally well drained.

Cecil sandy loam is one of the important agricultural soils of the county, and a fairly large proportion of the land has been cleared and is under cultivation. The rest supports a growth of old-field pine and some hardwoods. About 30 percent of the cultivated land is devoted to corn, about 50 percent to cotton, about 15 percent to tobacco, and the rest to small grains, sweetpotatoes, and garden

vegetables. Corn yields range from 10 to 25 bushels an acre when an acre application ranging from 200 to 400 pounds of 2-8-2 or 3-8-3 fertilizer is used. Some farmers use from 100 to 150 pounds of nitrate of soda as a top dressing. Cotton yields from one-half to 1 bale an acre where fertilized with from 300 to 500 pounds of 3-8-3, 3-12-3, or 4-10-4 mixtures. Some farmers apply 100 pounds of nitrate of soda soon after the first chopping of the cotton. Tobacco yields from 600 to 1,000 pounds an acre and usually receives from 800 to 1,000 pounds of 3-8-3 or 3-8-5 fertilizer. Fruits, sweetpotatoes, and garden vegetables give good returns on this soil.

Cecil sandy loam, mixed phase.—The mixed phase of Cecil sandy loam differs from typical Cecil sandy loam in that the soil is not uniform in color or texture over any fair-sized field. This mixed soil includes spots of Cecil sandy loam and spots of Cecil clay loam so intricately mixed and of such small size that no separation could be made of the soils on a small-scale map. This mixed or spotted condition of the surface soil is caused in many places by erosion which has removed the sandy loam surface soil and exposed the underlying red clay loam.

Cecil sandy loam, mixed phase, occurs in several fair-sized bodies east, south, and west of Franklinton, east of Louisburg, and northeast of Centerville.

Owing to the variable texture and structure of the soil, cultivation is not so easily carried on as on Cecil sandy loam. The surface relief of the mixed phase is more sloping than that of typical Cecil sandy loam, and this necessitates the construction of terraces to prevent further erosion of the surface soil and gullying. Some of the land has grown up to old-field pine.

This mixed soil is used mainly for the production of cotton and corn and to a small extent for tobacco—the tobacco being grown on those areas having the more sandy surface soil. Crop yields are slightly less, but fertilizer applications are about the same as those used for Cecil sandy loam.

Cecil coarse sandy loam.—Cecil coarse sandy loam is readily distinguished from Cecil sandy loam by its coarse texture, that is, there is a large quantity of coarse sand grains and a few small angular quartz gravel in the surface soil. The color of the surface soil is a little lighter than that of the sandy loam, and the subsoil contains more coarse sand particles. The parent material also is coarser.

Cecil coarse sandy loam is one of the more extensive soils of the county. It occurs in large areas in the western and northwestern parts. Large unbroken areas are developed around Liberty School south of Cedar Creek. Fair-sized bodies are near Centerville, Louisburg, and Randalls Chapel. In the northwestern part it occurs in the vicinity of Rocky Ford. Small areas are scattered here and there over the county.

This soil ranges in surface relief from almost level and undulating to gently sloping and sloping. It is exceptionally well drained, as it is slightly more open and porous than Cecil sandy loam. This soil is badly leached of the soluble plant nutrients, and it is deficient in organic matter. Some angular quartz gravel are present in the soil and in places on the surface.

Much of this land is under cultivation or was once cultivated and is now growing up to old-field pine. Cotton, tobacco, corn, and cowpeas are the principal crops grown. Yields of these crops, the fertilizer treatment, and methods of cultivation are essentially the same as those for Cecil sandy loam. Recommendations in regard to the improvement of Appling coarse sandy loam apply equally well to this soil.

Cecil fine sandy loam.—The surface soil of Cecil fine sandy loam ranges from grayish-yellow to grayish-brown fine sandy loam to a depth ranging from 6 to 9 inches. It is underlain by yellowish-red or reddish-yellow fine sandy clay ranging in thickness from about 2 to 5 inches, and this forms the intermediate grade of material between the surface soil and the subsoil. The typical subsoil is red heavy brittle clay continuing to a depth ranging from 40 to 50 or more inches. This clay grades into the yellow, mottled with light red, soft, decomposed fine-grained schist or granitic rock material. In a few places angular quartz stones appear on the surface, and there are veins of quartz in the subsoil, also mica flakes in the lower part.

Cecil fine sandy loam occupies large areas in the northeastern, southeastern, and western parts of the county. Some of the largest unbroken bodies are along the Warren County line in the vicinity of Alert, along the Granville County line west of Franklinton and Youngsville, south of Cypress Chapel, and northeast and south of Centerville.

The surface relief is undulating or gently rolling, and the land is well drained. Most of the soil occupies high positions on the ridge crests and interstream areas and has favorable surface relief for agricultural purposes.

Corn, cotton, and tobacco are the principal crops grown. In some places the tobacco produced on this soil is of a heavier grade and a slightly darker type than that grown on the coarse sandy loams. Under the same fertilization, the yields of corn and cotton are similar to those obtained on Cecil sandy loam.

Cecil fine sandy loam is a mellow and easily tilled soil which responds readily to the addition of manures and fertilizers and also to the turning under of green-manure crops. This soil is better suited to the production of wheat, clovers, and hay crops than the lighter textured sandy soils. Garden vegetables, sweetpotatoes, sorgo, and fruits are grown for home use.

RED CLAY LOAM SOILS

The soils comprising this group are locally known as "red clay lands", and they include Georgeville silty clay loam, Davidson clay loam, and Cecil clay loam. Both the surface soils and subsoils are red and are heavy in texture and structure. Each of these soils is readily distinguished from the soils of the other groups by the differences in color and structure of both the surface soils and subsoils and particularly by the kind of parent material which has formed them. They are sticky and slightly plastic when wet but hard and brittle when dry.

These soils occur mainly in the northern part of the county, but some areas are scattered over all parts. The surface relief ranges

from gently rolling to rolling, and there are some steep slopes. The relief, therefore, is less smooth than that of the gray sandy soils. These soils are naturally well drained in the surface soil and in the upper part of the subsoil, but the lower subsoil layers, on account of their heavy texture, take up water very slowly. These red soils do not warm up so early in the spring as the gray sandy soils, and crops do not mature so early on them.

The red clay loam soils, if not plowed under proper moisture conditions, break into clods, and some of the clods remain throughout the entire period of cultivation, unless the land is thoroughly harrowed. These soils require stronger work animals and heavier machinery for successful operation than do the gray sandy soils. When they are plowed deep, or subsoiled, they absorb a large amount of rainfall. This is an important factor in the prevention of sheet erosion and gullying. These soils erode badly on steep slopes unless they are protected by terraces. Much erosion has taken place on many of the hillsides.

The red clay loam soils are low in organic matter. The effects of turning under green-manure crops or applying barnyard manure endure well, as the heavy subsoils hold the manure, thereby preventing the soil from leaching. These soils contain more potash and lime than the gray sandy soils. Cecil clay loam, especially in the subsoil, contains a high percentage of potash and a low percentage of lime, whereas Davidson clay loam has a lower content of potash and a higher content of lime.

A much smaller percentage of the soils of this group is under cultivation than of the sandy soils. These soils are used mainly for corn, small grains, and hay, although some cotton is grown. They are the best upland soils in the piedmont plateau for the production of corn, wheat, oats, and alfalfa.

Cecil clay loam.—In cultivated fields the 4- to 6-inch surface soil of Cecil clay loam is dark-brown or reddish-brown clay loam carrying sufficient sand to make the material friable under favorable moisture conditions. In wooded areas the topmost 1 to 3 inches contains enough organic matter to give the soil a darker color and a more loamy feel. The subsoil is red stiff but brittle clay which, at a depth ranging from 24 to 36 inches, passes into lighter red more friable crumbly clay. At a depth between 4 and 6 feet, the subsoil is underlain by soft decomposed rock material of mixed gray, yellow, and red colors. In a few places the topmost 1 to 3 inches of surface soil is sandy loam, and in some places all the surface soil has been removed by erosion and the red clay is exposed. Small mica flakes and angular quartz sand are noticeable in the subsoil in many places, and here and there quartz veins occur through the subsoil and angular quartz fragments are present on the surface.

Cecil clay loam is fairly well distributed over the county. A large area occurs in the northern part east of Schlosstown. Bodies are developed in the extreme southern part north and south of Anderson Bridge, in the northeastern part south of Centerville, and in the central part northeast of Louisburg. Fair-sized areas are west of Franklinton, along Sandy Creek south of Alert, and south and west of Youngsville.

This soil occurs mainly on the slopes of gently rolling or strongly rolling areas, where natural drainage is good. Erosion is active in most places on the steeper slopes, and one of the chief problems of soil management is to control such erosion. This may be accomplished in part by the construction of terraces and by strip farming.

Only about 15 percent of Cecil clay loam is under cultivation. No tobacco is grown, except where spots of this soil are included in a field of sandy loam. Old-field pine is the prevailing forest growth, particularly over the once-cultivated land. Cotton yields from one-fourth to three-fourths bale an acre and corn from 8 to 25 bushels. Cotton is generally fertilized with from 300 to 500 pounds to the acre of a 3–8–3 fertilizer and corn with about 200 to 300 pounds of a similar grade. A few patches of rye, oats, wheat, clover, and soybeans are grown on this soil.

Cecil clay loam, because of its heavy texture, is more difficult to handle than the light-textured sandy loams, and it can only be tilled under a narrow range of soil moisture. It is a strong soil, capable of being built up to a high state of productivity, and would naturally produce large yields of wheat, corn, oats, clover, soybeans, and grasses.

Georgeville silty clay loam.—Georgeville silty clay loam is one of the small and comparatively unimportant soil types in this county, and it occurs only in the extreme northeastern part. The largest bodies are east of Centerville, northeast and south of Wood, and at Gold Mine. The land has a sloping or rolling surface relief and is naturally well drained. Most of it is forested to hardwoods, together with some pine.

The 3- to 5-inch surface soil is pale-red or reddish-brown silty clay loam which is smooth and has a flourlike feel. The subsoil is bright-red or pale-red rather stiff but brittle silty clay that breaks down into irregular-shaped lumps which can easily be crushed between the fingers. This material continues to a depth ranging from 30 to 50 inches, where it passes into soft disintegrated and partly decomposed slate rock of dark-red, purple, pink, and yellow colors. In a few places in the wooded areas, the topmost 2 or 3 inches of the soil are yellow or reddish-yellow silt loam. A few angular quartz rock are scattered over the surface, and veins of quartz occur throughout the surface soil and subsoil.

About 10 percent of this land is cultivated and is used for the production of corn, cotton, wheat, and soybeans. Corn yields range from about 20 to 30 bushels an acre, where an acre application of about 300 pounds of 3-8-3 or 2-8-2 fertilizer is used. Cotton produces from about one-third to three-fourths bale an acre where fertilized with from 300 to 500 pounds of 2-8-2 or 3-8-3. Wheat yields from 10 to 20 bushels an acre, and usually from 300 to 400 pounds of phosphoric acid are applied. This is a strong soil and one which can be built up to a fair state of productivity. The smoother areas can be farmed, and the steeper and more broken parts should remain in forest.

Davidson clay loam.—The surface soil of Davidson clay loam is reddish-brown or red clay loam from 4 to 6 inches thick. The subsoil is dark-red or maroon, smooth, stiff but brittle clay which continues to a depth ranging from 30 to 40 inches. This material

grades into a 10- to 20-inch layer of light-red friable clay containing, in some places, small scales of mica. Below this is mottled or streaked dark-red and ocherous-yellow clay and soft decomposed dark-colored rock material. In wooded areas a thin layer of dark leaf mold overlies the surface soil, and the first few inches of the soil in these areas contain a noticeable amount of organic matter.

Davidson clay loam occupies a small acreage in the northeastern part of the county. The largest areas are south of Dickens along Red Bud Creek, and smaller areas lie south of Centerville. The surface relief ranges from gently rolling to rolling, and natural surface drainage is excellent.

Only a small percentage of this soil is farmed, and the rest supports a growth of hardwoods, together with a few pines. The crops grown, fertilizer treatment, agricultural methods, and yields are about the same as those on Georgeville silty clay loam and Cecil clay loam. Davidson clay loam is considered the best soil in the State for the production of alfalfa. It is also one of the most desirable soils for wheat, clover, and hay crops. This soil is capable of being built up to and easily maintained in a high state of productivity through crop rotation and the incorporation of organic matter.

MISCELLANEOUS SOILS

The group of miscellaneous soils includes a few soils of small extent and a miscellaneous classification of soil material, which do not properly fit into the other two groups. These soils are Altavista fine sandy loam, Wilkes coarse sandy loam, Worsham sandy loam, Congaree silt loam, and meadow (Congaree material). These soils differ widely in color, structure, texture, surface relief, and drainage conditions. Only a small proportion of the land is under cultivation. On account of poor drainage and broken surface relief, these soils are best suited for the summer pasturing of cattle and for forestry. Congaree silt loam is naturally a strong fertile soil and would produce large yields of corn and hay, if the land were well drained. The aggregate acreage of these soils is small. They are scattered to more or less extent throughout all parts of the county but occur mainly in the central and southern parts.

Wilkes coarse sandy loam.—Areas of Wilkes coarse sandy loam are very variable in texture, color, and depth. This soil may be considered a soil condition rather than a uniform soil type. In the more uniform areas, the 5- to 7-inch surface soil is yellowish-gray coarse sandy loam. It is underlain by yellow, brownish-yellow, and in a few places mottled light-red and yellow coarse sandy clay extending to a depth ranging from 15 to 20 inches. This passes into yellow, gray and yellow, or brownish-yellow plastic clay. In many places the surface soil is only a few inches thick and is directly underlain by the soft disintegrated rock. In some places erosion and gullying have removed, not only the surface soil but all the subsoil, thereby exposing the rock formation. Locally, the surface soil and the upper part of the subsoil are similar to corresponding layers of the Durham or Appling soils, but the lower part of the subsoil is heavy tough or plastic clay.

Wilkes coarse sandy loam occurs in narrow strips and also in fairly wide areas along Tar River and Cedar, Buffalo, Norris,

Cypress, and Crooked Creeks. It is developed on the slopes between the smoother upland areas and the first bottoms. The surface relief ranges from rolling to hilly, broken, and steep. In many places the land is badly gullied and has been ruined for agricultural purposes.

From 3 to 5 percent of this soil is under cultivation. In the best developed areas some bright tobacco is grown in small patches. The best use for the greater part of this land is forestry.

Worsham sandy loam.—Worsham sandy loam occurs in several small areas, ranging in size from 1 to 5 acres, in close association with the Cecil, Durham, and Appling soils. The total acreage of this soil is small. It occurs mainly in the extreme southern part of the county, east and south of Pilot and east of Louisburg. The surface relief is almost level or gently sloping in the direction of or toward the flow of the streams. In places this soil occupies slight depressions, in most places continuous to the heads of streams. Drainage is poor, as the soil receives seepage water from higher lying areas, and because of its flat surface the water runs off slowly.

The color, texture, and structure of this soil vary considerably. The greater part of it is gray or dark-gray sandy loam to a depth ranging from 5 to 8 inches. This material passes into light-gray or yellowish-gray heavy sandy loam or sandy loam speckled or mottled with brown, which continues to a depth ranging from 20 to 30 inches. Underlying this material is mottled light-gray, yellow, and brown slightly sticky, and in places rather stiff, heavy sandy clay or clay. In a few places the surface soil is dark-gray or almost black silt loam or silty clay loam.

Worsham sandy loam has not been drained and reclaimed for general farming purposes. The best use for this soil is summer pasturage for cattle, and forestry.

Altavista fine sandy loam.—In cultivated areas the surface layer of Altavista fine sandy loam is gray or yellowish-gray fine sandy loam to a depth of about 6 inches. In the wooded areas the 1- to 3-inch surface layer is dark gray. This layer is underlain by pale-yellow or grayish-yellow heavy fine sandy loam extending to a depth of 8 or 10 inches. The subsoil is yellow heavy firm but moderately friable clay or heavy fine sandy clay, containing a small quantity of mica scale and continuing to a depth ranging from 20 to 30 inches. Underlying this is yellow heavy sticky very fine sandy clay mottled with light gray and streaks of red. In a few places the surface soil is gray silt loam underlain by mottled yellow and rust-brown silty clay. Such areas are similar to Roanoke silt loam mapped in a few counties in North Carolina.

Altavista fine sandy loam occurs in fair-sized areas along Cedar Creek northeast of Raynor. A large body lies east of Louisburg along Tar River. Three small areas are near Anderson Bridge, and a few small bodies lie along Sandy and Cypress Creeks.

This soil is developed on second bottoms or terraces and lies above normal overflow of the streams. The surface relief ranges from almost flat to undulating. Natural surface drainage is poor, but the land can be drained by means of open ditches, as the banks of the ditches would stand up well.

Only a very small percentage of this soil is under cultivation. Yields of cotton and corn are low, except where the land is heavily fertilized. This soil needs better drainage, lime, and the incorporation of organic matter. The timber growth includes pine, oak, sweetgum, hickory, elm, and beech. Most of the original timber has been cut. If the land were properly handled it could be used for pasturage and general farming.

Congaree silt loam.—The surface soil of Congaree silt loam, to a depth ranging from 8 to 14 inches, is brown or yellowish-brown mellow and friable silt loam. Underlying this and continuing downward to a depth ranging from 35 to 40 or more inches, the material is light-brown or yellowish-brown fine sandy clay or heavy very fine sandy loam. The surface soil and more particularly the subsoil contain a noticeable quantity of small mica scales which give the soil, when rubbed between the fingers, a somewhat greasy and slick feel. Bordering the stream channels in a few places are narrow strips of light-brown fine sand or fine sandy loam. Such strips in general occupy slightly higher positions than the typical Congaree silt loam.

Congaree silt loam is a soil developed from alluvium, and the materials have been washed from the higher lying areas and deposited by the streams at times of overflow. This soil occurs in long, narrow strips along Tar River and Little Shocco, Cedar, and Crooked Creeks. The surface relief ranges from level to undulating, with a slight gradient toward the stream and in the direction of the stream flow. The brown color of the surface soil and subsoil indicates good drainage for a first-bottom soil. The land, however, is subject to frequent overflow as it lies only a few feet above the normal level of the streams.

In its present condition only a small percentage of Congaree silt loam is used for farming. Where drained and not subject to too heavy overflow, this soil produces large yields of corn and hay. It is naturally a strong fertile soil and contains a large quantity of plant nutrients. It is naturally the best corn soil in the county. More of the land could be utilized for crops if the creeks were properly dredged and the land ditched and limed. The main use for Congaree silt loam is summer pasturage of cattle and forestry.

Meadow (Congaree material).—Meadow (Congaree material) occurs as narrow strips ranging from 100 to more than 800 feet in width in the first bottoms along all the streams in the county, except along Tar River and the lower reaches of Cedar Creek. It lies only a few feet above, and in some places is almost level with, the normal water level of the streams, so that it is subject to frequent overflows, and new material is constantly being added. Some of the land is in a saturated condition during part of the year.

Meadow (Congaree material) includes mixed soil materials so varied in color, texture, and structure that they cannot be separated into definite soil types of the Congaree series. The material is mainly of alluvial origin, although in some places some colluvial wash has been included with it. The texture varies from sand to silt and clay, and the color from light gray to brown.

Practically none of this land is under cultivation. The heavier textured areas are naturally fertile and, if the land were drained

and reclaimed, large yields of corn, hay, and sorgo could be produced. Under present conditions the best use for this material is summer pasturage for cattle, and forestry.

SOILS AND THEIR INTERPRETATION

Franklin County lies on the eastern edge of the piedmont plateau, in the Red and Yellow soils region of the United States. The general surface relief ranges from undulating or gently rolling to rolling, and the land is the smoothest in the piedmont plateau of North Carolina. The area is thoroughly dissected by streams and intermittent drainageways, and natural surface drainage is good.

The soils are dominantly light in color, ranging from light gray and pale yellow to reddish brown and red in the surface layers. Conditions have not been favorable for the accumulation of large quantities of vegetable matter in the soils, and because of this they are deficient in organic matter. They have developed under a forest cover consisting of pine and several varieties of oaks, together with some hickory and poplar. In the forested areas a very thin layer of leaf mold covers the surface, where it has not been burned by fire, and a comparatively small amount of organic matter is mixed with the topmost inch or two of the surface soil. However, when the land is cleared of its forest growth and cultivated for 2 or 3 years, the small amount of organic matter originally present is soon disseminated.

In this section, characterized by heavy rainfall and warm temperature, leaching and erosion are two factors in active operation on the surface soils during the greater part of the year, except at short periods in the winter when the soil is frozen to a depth of a few inches. A large part of the soluble plant nutrients has been removed, as they were contained in the fine materials originally present in the A horizon. Some of the finer materials have been carried away through erosion of the surface soil, and some have been carried down and deposited in lower parts of the profile. The A horizon of the greater part of the soils of the county is highly eluviated, whereas in the normally developed soils the B horizon shows rather strong illuviation.

The soils in general range from slightly acid to strongly acid. Davidson clay loam is slightly acid or almost neutral, whereas the Appling, Durham, and Cecil soils are strongly acid.

Erosion of the surface soil, especially on the steeper slopes, has been active in many places where the soils have been improperly managed. Through such erosion and subsequent gullying, which have in many places reached serious proportions, not only have the surface features been changed but the soil texture itself. In many places on the hillsides and steeper slopes, the sandy surface soil has been entirely removed, exposing the underlying heavier material of the B horizon and in some places the partly disintegrated rock. This is particularly true in some areas of the Cecil, Appling, and Wilkes soils.

The principal rock formations underlying the soils of this county are granites, gneissoid granites, gneiss, schist, diorite, and slate. In the western part granites and gneiss prevail, whereas in the north-

eastern part, southeastern part, southern end, and southwestern corner, fine-grained schist occurs under rather large areas. In the northeastern part there is a fair-sized area underlain by dark-colored basic rock, mainly diorite, or niggerhead rock. In the extreme northeastern corner, beneath an area including a few square miles is the Carolina slate formation more or less mixed with the schist.

From the material resultant from the disintegration and decomposition of these rocks, the soil-building processes have produced the various soils of the county. A close relationship exists between the different soil types and the parent material. The soil-forming processes acting on the weathered material from the granites and gneiss give rise to the Appling and Durham soils, Cecil sandy loam, and Cecil coarse sandy loam, and in a similar way the fine-grained schist has caused the formation of Cecil fine sandy loam. This same process applies to the development of Georgeville silty clay loam from the Carolina slate rock and Davidson clay loam from the dark-colored basic rocks. These rocks have disintegrated and weathered to a depth ranging from a few feet to 40 or more feet, but the solum in most places ranges from 3 to 10 or more feet, and the C_1 material, or the disintegrated or partly decomposed rock, varies considerably in thickness. There is no uniformity in the color, texture, or structure of the partly decomposed rock which underlies the uniformly heavy and well-oxidized B horizon.

Angular quartz fragments are present on the surface in a few places, and veins of quartz occur locally throughout the solum and disintegrated material. A few boulders are present here and there. Probably a part or all of Franklin County was formerly covered by a thin layer of sandy coastal-plain material, as some rounded quartz gravel and coarse sand are seen in the eastern part.

Along practically all the streams are narrow strips of alluvium, or recent geological material, which has been washed from the uplands and deposited during times of overflow by the streams. In a few places the streams have built up rather high second bottoms, or terraces. With the exception of the material on the terraces, all the alluvium is so recent in age that no normal soil profile has developed.

The soils of the county are grouped in series on the basis of their original color, consistence of the soil material, general topographic features, drainage conditions, and parent material. The individual soil types within the series differ from each other in the percentage of sand, silt, and clay contained in the surface soils.

There are two important groups of soils. The first comprises those soils which have a normal soil profile or have the most mature profile of the soils in the county. The most striking feature of the texture profile of the normal soils is the presence of a comparatively light textured surface layer, or A horizon, which is underlain by the heavy-textured uniformly colored and well-oxidized B horizon, and this by a third still deeper layer, the C horizon, which varies considerably in texture and consistence but is prevailingly lighter than the B horizon.

Appling coarse sandy loam, Appling sandy loam, Durham sandy loam, Cecil sandy loam, Cecil coarse sandy loam, and Cecil fine sandy loam may be considered the normally developed or mature

soils of the county. These soils have a light-textured A horizon and a heavy-textured B horizon. The B horizon is the seat of the accumulation of the largest amount of clay, iron, and aluminum in the profile. It possesses definite properties as regards consistence, texture, and structure. The differences between these soils can best be brought out in a description of the profiles of some of the large and important soil types.

Following is a description of a profile of Cecil sandy loam in a forested area covered with old-field pine, 1 mile west of Franklinton:

A_1. 0 to 1 inch, dark-gray sandy loam containing a large quantity of organic matter.
A_2. 1 to 5 inches, yellowish-brown mellow sandy loam.
B_1. 5 to 8 inches, brownish-yellow friable sandy clay.
B_2. 8 to 23 inches, stiff but brittle red clay containing a small quantity of mica. The material is uniform in color and consistence. It breaks into irregular-shaped lumps which can easily be crushed into smaller crumb aggregates.
B_3. 23 to 43 inches, light-red, with mottlings of yellow, stiff brittle clay which is not quite so heavy as the material in the layer above. It contains considerable mica.
C_1. 43 to 53 inches, light-red and yellow friable partly decomposed granite or gneiss rock material containing a large quantity of mica.

Following is a description of a profile of Appling sandy loam, as observed one-fourth mile east of Katesville in an area forested with old-field pine:

A_1. 0 to 1 inch, dark-gray sandy loam containing a large quantity of organic matter.
A_2. 1 to 8 inches, grayish-yellow mellow and friable light sandy loam.
B_1. 8 to 11 inches, reddish-yellow heavy sandy clay.
B_2. 11 to 20 inches, yellowish-red stiff but brittle clay containing faint mottlings of light red and yellow. This material breaks into irregular-shaped lumps and has no definite structure.
B_3. 20 to 38 inches, light-red, mingled with white and yellow, stiff but brittle clay having about the same consistence as that in the layer above.
C_1. 38 to 50 inches, mingled yellowish-red, white, and yellow, hard but brittle disintegrated and partly decomposed granite. Some former root holes have been filled with dark-brown or brown material.

The soils of the Durham series differ essentially from those of the Appling in that the B horizon of the Durham is yellow clay which is less hard and stiff than the B horizon of Appling sandy loam.

Georgeville silty clay loam, Cecil clay loam, Wilkes coarse sandy loam, and Worsham sandy loam belong to the second group of soils and do not have normal profile development. Cecil clay loam is in places a B–C soil; that is, practically all the original surface soil, or A horizon, has been removed through erosion, thereby exposing the B horizon.

Davidson clay loam differs from Cecil clay loam in its dark-red color throughout the profile and also in its low content of potash and comparatively high content of lime.

The solum throughout most of Davidson clay loam, Cecil clay loam, and Georgeville silty clay loam is so heavy that no definite horizons have developed or that no sharp line of demarcation between these horizons is evident. The A horizon grades into the B, and in a

similar manner the B passes into the C. The B horizon is everywhere heavier than the A horizon, and the C is slightly lighter than the B.

A description of a profile of Georgeville silty clay loam, as observed in a wooded area near Gold Mine in the northeastern part of the county, is as follows:

A. 0 to 4 inches, heavy, smooth, and moderately friable reddish-brown silty clay loam.
B. 4 to 42 inches, stiff but brittle and smooth red silty clay which crumbles to a fairly friable mass under ordinary moisture conditions. It is practically free from quartz sand.
C. 42 inches +, red, purple, pink, and yellow soft disintegrated and partly decomposed Carolina slate or fine-grained schist.

The entire solum is characterized by a high content of silt.

The Wilkes soil represents a soil condition rather than a definite soil type. It is derived from aplitic granite which is cut in places by dikes of diorite, and there is no uniformity to the soil profile. The Worsham soil differs from the Wilkes in that it is darker in the surface soil and has a mottled gray, yellow, rust-brown, and white subsoil. It is naturally poorly drained.

The material in the first bottoms developed from alluvium is so recent in deposition that no definite profile has developed. This material is constantly being added to by each overflow. Areas in which the color and texture are uniform throughout are classed as Congaree silt loam. Many narrow strips of alluvial material are so variable in texture and structure that they could not be classed as a soil type, and such areas are designated as meadow (Congaree material). In a few places there are small areas of second bottoms, or old alluvial material which has lain for a long enough time sufficiently high above overflow to develop a rather definite profile. These areas have been mapped as Altavista fine sandy loam.

Table 5 gives the results of pH determinations on samples of three soils as made by E. H. Bailey, Bureau of Chemistry and Soils, by the hydrogen-electrode method.

TABLE 5.—*pH determinations on three soils from Franklin County, N. C.*

Soil type and sample no.	Depth	pH	Soil type and sample no.	Depth	pH
Appling sandy loam:	*Inches*		Durham sandy loam:	*Inches*	
237401	0–1	4.7	237415	0–3	4.6
237402	1–8	5.0	237416	3–12	4.8
237403	8–11	5.1	237417	12–28	4.9
237404	11–20	5.1	237418	28–42	4.9
237405	20–38	5.2	Davidson clay loam:		
237406	38–50	5.0	237422	0–6	5.5
			237423	6–35	5.5
			237424	35–47	5.3
			237425	47+	5.1

SUMMARY

Franklin County is situated in the north-central part of North Carolina. Louisburg, the county seat, is about 32 miles northeast of Raleigh. The surface relief ranges from almost level and gently rolling to rolling and broken as the streams are approached. This

county has the smoothest surface relief of the piedmont counties in the State. Good surface and internal drainage prevail throughout the greater part of the soils. Rainfall is abundant, and the temperatures are fairly equable. The frost-free season extends over a period of 197 days.

The various soils bear a close relationship to the parent material. The surface soils are dominantly sandy, light-colored, and contain only a small quantity of organic matter. All the soils, with the exception of narrow strips of alluvial material, have been formed, through the soil-building processes, from the disintegrated and weathered material of the underlying rocks. The principal rock formations are granites, gneiss, and schist, together with small areas of dark-colored rocks and slates. The granites, gneiss, and schist are high in potash, and the subsoils are correspondingly high in potash.

There are two important groups of soils. The first comprises the soils having gray sandy surface soils, including all the soils of the Appling, Durham, and Cecil series, with the exception of Cecil clay loam. These soils are well suited to the production of bright tobacco and cotton. The second group includes the red clay loam soils—Georgeville silty clay loam, Davidson clay loam, and Cecil clay loam. These soils, on account of their texture and structure, are adapted to the production of small grains, corn, clovers, and hay crops.

Cotton and tobacco are the principal cash crops. Corn, hay, and rye are subsistence crops used mainly for feed for work animals and for fattening hogs. Sweetpotatoes, apples, peaches, and other fruits and garden vegetables are grown for home consumption, and a small quantity is sold.

Both the climate and soils are favorable for the production of bright tobacco, cotton, peanuts, fruits, sorgo, and garden vegetables. Small areas of rough, broken, or steeply sloping land can best be used for forestry. Some of the first-bottom soils are well adapted to pasture grasses and if drained and reclaimed would return large yields of corn.

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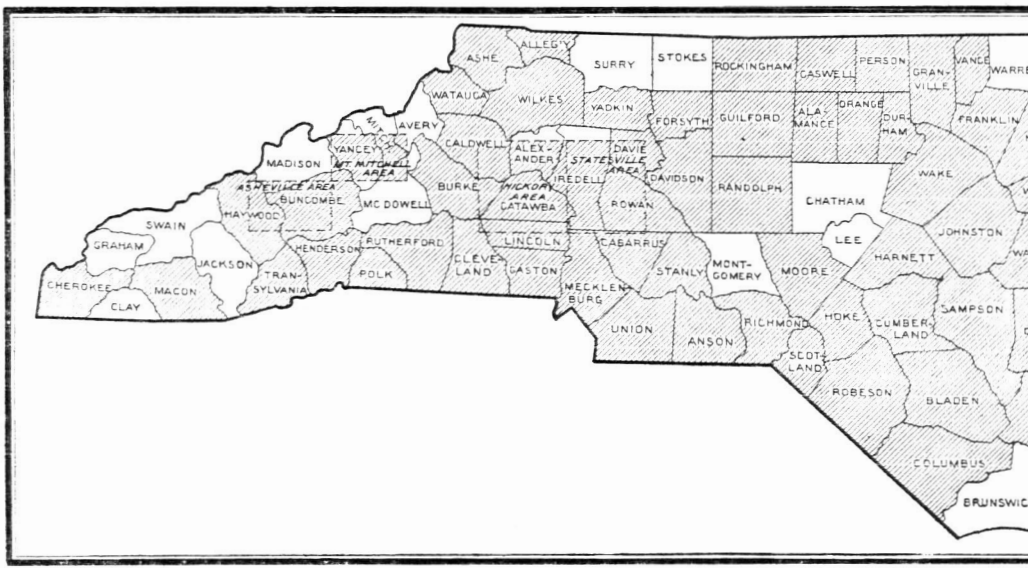
There shall be printed, as soon as the manuscript can be prepared with the necessary maps and illustrations to accompany it, a report on each soil area surveyed by the Bureau of Chemistry and Soils, Department of Agriculture, in the form of advance sheets bound in paper covers, of which not more than 250 copies shall be for the use of each Senator from the State and not more than 1,000 copies for the use of each Representative for the congressional district or districts in which a survey is made, the actual number to be determined on inquiry by the Secretary of Agriculture made to the aforesaid Senators and Representatives, and as many copies for the use of the Department of Agriculture as in the judgment of the Secretary of Agriculture are deemed necessary.



Areas surveyed in North Carolina, shown by shading. Detailed surveys shown by nort

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U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF CHEMISTRY AND SOILS
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CHARLES E. KELLOGG, IN CHARGE SOIL SURVEY

SOIL MAP
FRANKLIN COUNTY
NORTH CAROLINA

NORTH CAROLINA DEPARTMENT OF AGRICULTURE
W. A. GRAHAM, COMMISSIONER
NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION
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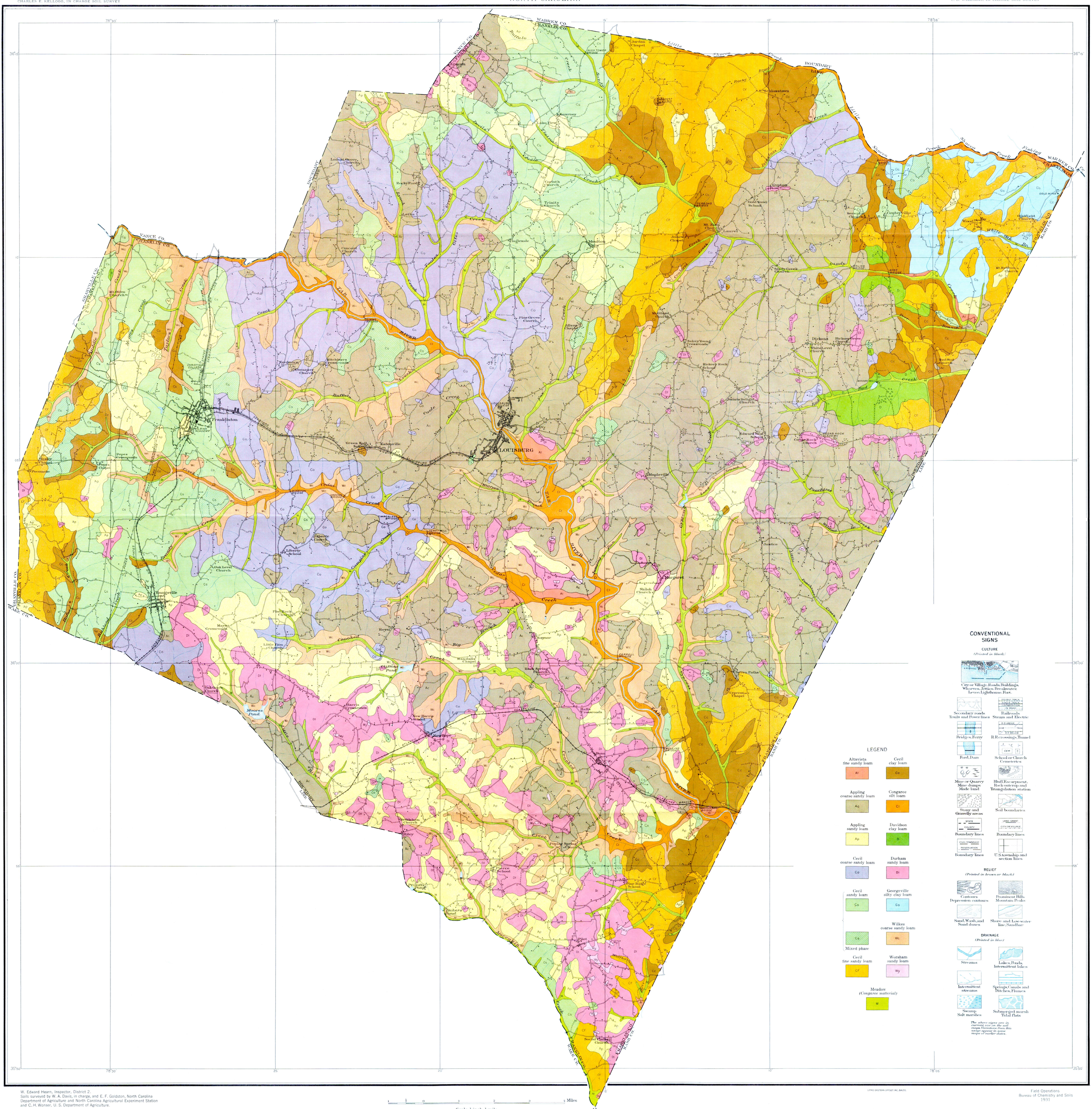

CONVENTIONAL SIGNS

CULTURE
(Printed in black)

City or Village, Roads, Buildings, Wharves, Jetties, Breakwater, Levee, Lighthouse, Fort.

Secondary roads, Trails and Power-lines

Railroads, Steam and Electric

Bridges, Ferry

R.R. crossings, Tunnel

Ford, Dam

School or Church, Cemeteries

Mine or Quarry, Mine dumps, Made land

Bluff, Escarpment, Rock outcrop and Triangulation station

Stony and Gravelly areas

Soil boundaries

Boundary lines

Boundary lines

Boundary lines

U.S. township and section lines

RELIEF
(Printed in brown or black)

Contours, Depression contours

Prominent Hills, Mountain Peaks

Sand, Wash, and Sand dunes

Shore and Low-water line, Sandbar

DRAINAGE
(Printed in blue)

Streams

Lakes, Ponds, Intermittent lakes

Intermittent streams

Springs, Canals and Ditches, Flumes

Swamp, Salt marshes

Submerged marsh, Tidal flats

The above signs are in current use on the soil maps. Variations from this usage appear in some maps of earlier dates.

LEGEND

Altavista fine sandy loam — Al	Cecil clay loam — Ce
Appling coarse sandy loam — Ac	Congaree silt loam — Ci
Appling sandy loam — Ap	Davidson clay loam — D
Cecil coarse sandy loam — Co	Durham sandy loam — Dl
Cecil sandy loam — Cs	Georgeville silty clay loam — Gs
Mixed phase — Cs	Wilkes coarse sandy loam — Wc
Cecil fine sandy loam — Cf	Worsham sandy loam — Wy
Meadow (*Congaree material*) — M	

W. Edward Hearn, Inspector, District 2.
Soils surveyed by W. A. Davis, in charge, and E. F. Goldston, North Carolina Department of Agriculture and North Carolina Agricultural Experiment Station and C. H. Wonser, U. S. Department of Agriculture.

1 ½ 0 1 2 3 4 Miles
Scale 1 inch=1 mile

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Field Operations
Bureau of Chemistry and Soils
1931